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ABSTRACT

In order to test the usefulnes of the Health Belief Model (a model designed to measure health practices, attitudes, and knowledge), a survey of Potter County, Pennsylvania was conducted, and 283 responses from adult females without chronic illnesses were analyzed. The dependent variables employed were regulating diet and getting regular exercise. Drawn from the model, the following 4 independent variables were analyzed: perceived susceptibility to heart disease, perceived difficulty of participating in the 2 selected preventive health practices, knowledge of calories, and preventive health actions taken during the last year. The control variables included: age, income, education, and organizational participation. Findings indicated: (1) perceived susceptibility was not related to either eating habits or physical activity; (2) perceived difficulty of the preventive behavior was positively correlated with both dependent variables; (3) knowledge of calories was positively related to getting regular exercise; (4) education was positively correlated with preventive eating habits. It was concluded that health educators would find it useful to attempt to reduce perceived barriers to preventive health by initiating child care facilities, food preparation study groups, etc. (JC)

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THE "HEALTH BELIEF MODEL" APPLIED TO TWO PREVENTIVE HEALTH BEHAVIORS AMONG WOMEN FROM A RURAL PENNSYLVANIA COUNTY

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CHAPTER I

INTRODUCTION

The importance of maintaining good health to the individual in our society was recently emphasized in a study by Palmore and Luikart (1972). They found that among 502 subjects, both male and female, aged 45 to 69, self-rated health was more closely related to "life satisfaction" than were other socioeconomic, social-psychological, and activity variables.

Achieving and maintaining good health has long been recognized as closely tied to preventive health practices. Rather than coping with medical problems after they arise, a focus on preventing the problems has proven more valuable (Baker, 1972). Now, health professionals are beginning to turn away from an emphasis on infectious diseases, which are no longer as prevalent in our society, to the question of how the principles of prevention and preventive health practices can be applied more usefully against chronic illnesses (Ingraham, 1972:21).

In addition to health professionals, sociologists in recent years have become interested in contributing to the field of preventive health. Much of the work of the sociologist has been directed to finding out what variables are most closely associated with the adoption of preventive health practices. With a better understanding of these variables influencing preventive health practices, those involved in trying to increase the general level of health in our society through increasing rates of participation in preventive health practices have a basis for programming educational activities.

Kasl and Cobb (1966), in a review article dealing with variables associated with preventive health practices, introduced the term "health behavior." Health behavior refers to "any activity undertaken by a person believing himself to be healthy, for the purpose of preventing disease, or detecting it in the asymptomatic stage" (Kasl and Cobb, 1966:246).

The objective of this thesis is to examine the relationship between each of two "health behaviors" - regulating diet and getting regular physical exercise - and various social-psychological, socio-economic, and demographic characteristics. Regulating diet and getting regular physical exercise were selected for consideration in this research because of their apparent importance in preventing coronary heart disease, the nation's leading killer (Stamler and Epstein, 1972).

Selected Behaviors Related to Coronary Heart Disease

Identification of the risk factors associated with coronary heart disease has assumed a place of top priority in medical research. Suggested factors include high blood pressure, high cholesterol levels, overweight, lack of physical activity, and smoking. Evidence on the causality of these factors is still partly circumstantial; further, there is no assurance that reduction of the risk factors will decrease the likelihood of coronary heart disease. However, evidence is sufficiently compelling to warrant preventive measures in these areas. While heredity and other factors are almost certainly also involved as risk factors, the above factors are most amenable to change (Epstein, 1972).

Getting regular physical activity, besides being one of the risk factors, is also tied to overweight and possibly high blood pressure. Regulating diet is related to high blood pressure, high cholesterol levels, and overweight. Thus, explaining these two may be a way to control 4 of the 5 risk factors (excluding smoking). Yet, while explaining these two behaviors appears very beneficial, few studies have dealt with finding out who participates in them. Considerable difficulty in measuring both exact amounts of physical activity and calories or nutrients consumed may have contributed to this lack of research.

Getting regular exercise and regulating diet differ from other preventive acts in at least three ways: 1) diet control and regular exercise do not necessarily involve health professionals such as other preventive acts do (e.g., chest X-rays, clinics); 2) they involve daily attention rather than once-a-year or once-a-month concern; and 3) these two health behaviors may not be as widely perceived by the general public as preventive acts as other actions. Kasl and Cobb (1966), in their review of the literature on health behavior, do not include any material dealing with continuous preventive health behaviors.

Research on Preventive Health Behavior

Two studies have been reported on the characteristics of people participating in voluntary physical activity programs. One dealt with actual participation and the other with willingness to participate. Actual participation was considered in a study by Heinzelmann and Bagley (1970), conducted at three universities with men aged 45-59 who

had high risk levels for coronary heart disease. At the beginning of an 18-month program, men were asked to indicate their reasons for participating. Reasons included the desire to feel better and healthier, concern about lessening the chance of a heart attack, and a desire to help the cause of medical research. Evaluations after the program revealed that leadership and social aspects of the program became influential in holding them in the program.

Teräslinna et al. (1969) explored the factors influencing willingness to participate in voluntary physical activity programs - they did not measure actual participation. With 1,708 men selected for study, data on age and physical fitness were obtained from periodic health examinations. Mailed questionnaires were used to assess willingness to participate. In a discriminant function analysis, those living nearer to the gymnasium, younger men, and the less physically fit were found to be the ones who were more willing to participate in the offered activities.

Other studies have dealt with health behaviors such as visiting the doctor for checkups, immunizations, and dental examinations, using isolated characteristics as predictors. Coburn and Pope (1974) found education, age, income, and social participation, in that order, to be the best predictors of health behavior. Douglass (1971) suggested that demographic and socioeconomic status characteristics are better correlates of health behavior than health beliefs, social influences, or cultural background. Tyroler et al. (1965) found that maternal influence on familial preventive health behavior was of maximum influence.

A further concern in the study of preventive health practices has been to uncover factors which are associated with a wide variety of preventive actions, and to find out whether or not preventive behaviors are unidimensional, i.e., a generalized pattern of responses. While preventive behaviors have often been assumed to be unidimensional in the past, two recent studies have indicated that this assumption is not substantiated.

Williams and Wechsler (1972) conducted research in Boston, using both a telephone survey of women aged 35-54 (N=161) and a mailed questionnaire to mothers (N=240) and fathers (N=139) of ninth grade students. No general preventive behavior syndrome was found to be present, whether conceiving of preventive behavior in its broadest sense, or limiting it to health behaviors. The best indicator of a general preventive health orientation was limiting caloric intake. Frequency of physician checkups, which is often chosen as a measure indicating preventive behavior, showed a lack of correlation with other preventive behaviors (e.g., not smoking, getting an adequate amount of sleep, exercising, limiting cholesterol intake, and not being obese).

Similarly, Steele and McBroom (1972) found that preventive health behavior was multidimensional, and highly consistent forms of health behavior were displayed by a very small proportion of respondents. Based on an analysis of persons 25 years of age or older in a rural area in Montana (N=1,730), the authors concluded that respondents' actions were "not focused on health as a general condition to be achieved through prescribed preventive action" (1972:391).

While the studies mentioned above have isolated various characteristics related to health behavior, or types of health behavior, they have not been set in a conceptual frame of reference for explaining health behavior. The theoretical framework which has most often been cited and tested in the literature, and which will be used for this study, is the Health Belief Model. In the following chapter, the Health Belief Model is explained and discussed. Chapter III deals with the methodology used in testing the Health Belief Model in this study. The analysis of the data is discussed in Chapter IV, and the final chapter gives the summary and conclusions.

CHAPTER II

THEORETICAL FRAMEWORK

Developed in the late 1950's by Rosenstock, Hochbaum, Leventhal, and Kegeles, at the Behavioral Science Section of the Public Health Service, the Health Belief Model focuses on attitudes and beliefs[1] of an individual in relation to his behavior (see Figure 1). The variables in the model, which is adapted from general social-psychological theory, and especially the work of Lewin, point to the subjective states of the individual, and how these are linked to health behavior. There are two classes of variables, "the psychological state of readiness to take specific action, and the extent to which a particular course of action is believed, on the whole, to be beneficial in reducing the threat" (Rosenstock, 1966:98).

Readiness to act includes the perceived susceptibility to a particular health condition (i.e., the subjective risks of contracting a condition) and the perceived seriousness of a given health problem to that individual. The model utilizes the individual's point of view rather than a clinical or professional point of view. Various formulations of the model appear; more recent ones have included the variable "importance of health," or a motivation variable. However, this was not measured in this study, and is not included here.

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[1] While some professionals have been careful to distinguish between the terms "attitude" and "belief," those social scientists who formulated the Health Belief Model did not differentiate, and thus, no distinction will be made here.

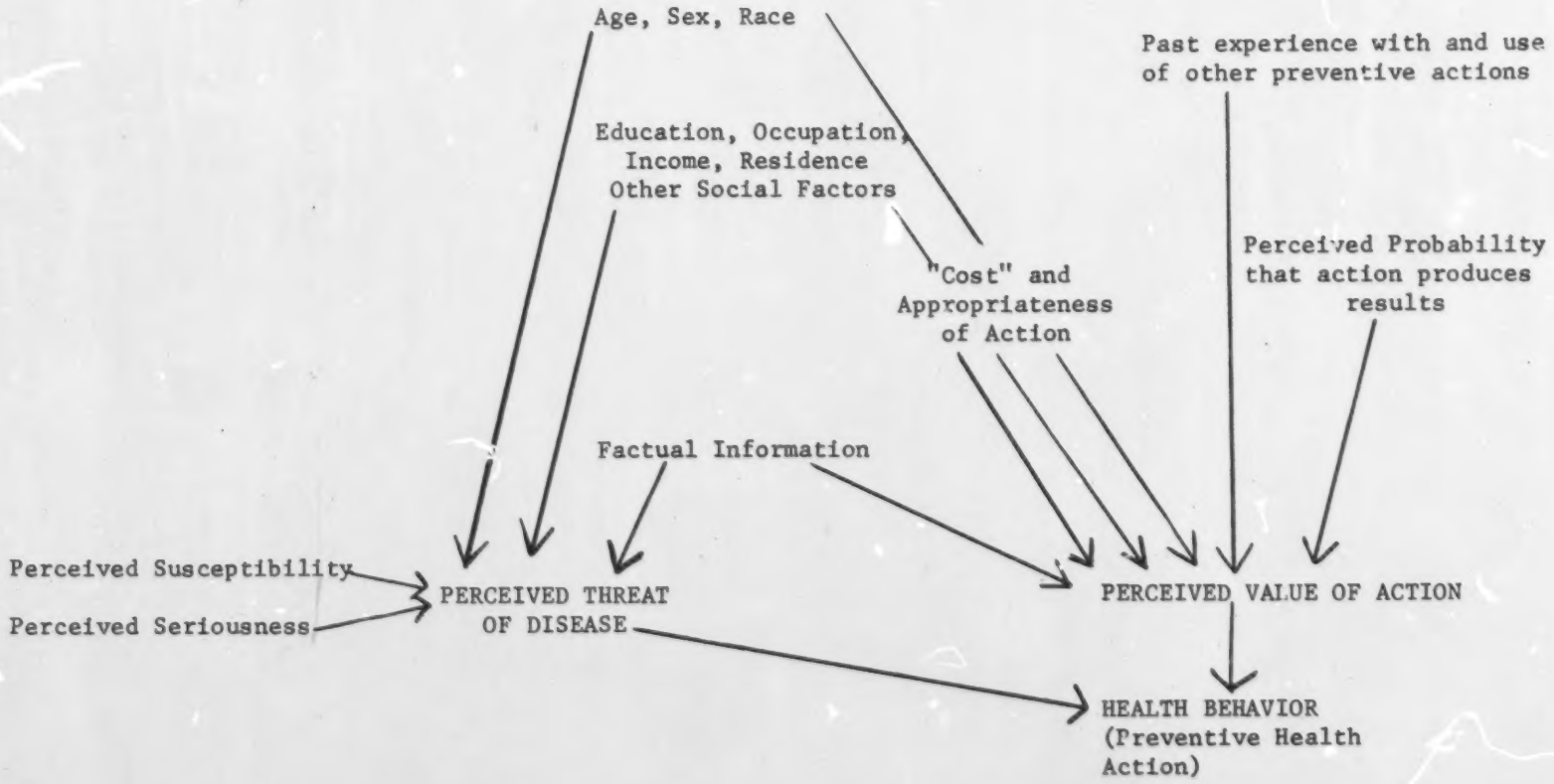
Age, Sex, Race
Past experience with and use of other preventive actions
Education, Occupation, Income, Residence Other Social Factors
"Cost" and Appropriateness of Action
Perceived Probability that action produces results
Factual Information
Perceived Susceptibility
Perceived Seriousness
PERCEIVED THREAT OF DISEASE
PERCEIVED VALUE OF ACTION
HEALTH BEHAVIOR (Preventive Health Action)

Figure 1. The Health Belief Model.

Source: Adaptation of the Health Belief Model appearing in Kasl and Cobb (1966:252).

The other class of variables consists of the perceived benefits of taking action. It is hypothesized that perceived value of the action is influenced by such factors as past experience with other preventive actions, the perceived probability that action produces results, cost and appropriateness of the action, knowledge of the disease and the preventive action, and certain demographic characteristics. Rosenstock also suggests that "cues to action" (a stimulus to trigger the appropriate health behavior) should be a part of the model (Rosenstock, 1974), but this has not been substantiated empirically and is not testable with cross-sectional data, such as are used here.

The Health Belief Model is based on the assumption that all behavior is motivated; therefore, Rosenstock states, "We may expect to understand, predict, and control man's behavior to the extent that we can adequately identify his motivations" (1960:296). These motivations may often conflict with each other, and behavior emerges as the resolution of that conflict (Rosenstock, 1960). The Health Belief Model is oriented to "avoidance," i.e., avoidance of disease. The "pull of the goal" is to "lower" susceptibility and severity (Maiman and Becker, 1974).

As Rosenstock notes, "The model does not attempt to provide a comprehensive explanation of all health action. Rather, what is attempted is the specification of several variables that appear to contribute significantly to an understanding of behavior in the health area" (1966:98).

There have been many studies undertaken to test this model of health behavior, both with prospective and retrospective data.[2] Although most of the studies have been retrospective (including the present study), they do not clearly validate the model since the respondents' beliefs and behavior are measured at the same time. This implicitly assumes that the beliefs existed at a point in time prior to the behavior. It also says nothing about the stability of beliefs. As McKinlay notes, it is just as reasonable to conclude that behavior causes beliefs as it is to conclude that belief causes behavior (1972:128).

Review of Retrospective Studies of the Health Belief Model

The first major retrospective study (see Figure 2) testing this model was carried out by Hochbaum in 1958. He gathered data pertaining to obtaining chest X-rays, with a sample of 1,201 persons from three major cities (Cleveland, Boston, and Detroit). Hochbaum's findings on the perceived seriousness or fear of tuberculosis were inconclusive; the perceived value variable taken alone also proved not significant. However, Hochbaum found that perceived susceptibility was related to having the X-ray, and the relationship was strengthened when perceived susceptibility and perceived value taken together were related to having the X-ray. Hochbaum's study also pointed to the importance of self-application of knowledge: if the respondent knew the facts about

[2] "Retrospective" is used by Rosenstock (1966) to refer to studies which gather data about respondents' beliefs and behavior during the same interview. "Prospective" refers to the type of study where beliefs are measured at one point in time, and behavior measured later.

Principle Investigator	Independent Variables: Perceived Susceptibility	Perceived Seriousness	Perceived Value	Dependent Variable	Important Findings
Hochbaum, 1958	Interaction of perceived susc. and perceived benefits	Not signif.	Not signif. alone	Chest X-ray for TB	Importance of self-application
Kegeles, 1963a	Signif.	Signif.	Signif.	Dental checkup	Found SES variables just as important
Heinzelman, 1962	Signif.	Signif.	Just measured knowledge - signif.	Taking penicillin to prevent recurrence of rheumatic fever	Optimal when all three present
Kirscht et al., 1966	Not signif.	Not signif.	Signif.	Pap tests	Belief in general susc. not widespread
Gochman, 1972	Signif.	Not measured	Signif. (for those with health motivation only)	Dental checkup	Added importance of having a health motivation

Figure 2. Results of Retrospective Studies of the Health Belief Model.

tuberculosis but did not make the information an integrated part of his beliefs, the participation rate was much poorer (1958).

Kegeles carried out research in 1958 concerning preventive dental care when dental visits were free (Kegeles, 1963a). While his findings supported the Health Belief Model, the applicability of these findings was greatly limited by a small final sample (N=77) caused by noncodable responses on one of the motivational variables.

Another study was conducted in 1962 by Heinzelmann on the use of penicillin by 284 college students who had a previous history of rheumatic fever. He found the use of penicillin significantly related to beliefs of perceived susceptibility, beliefs of seriousness, and beliefs and knowledge concerning various aspects of rheumatic fever. Heinzelman found that each of the belief dimensions influenced health behavior, with the optimal influence occurring when all three were present (1962).

A national survey of health beliefs, conducted in 1963 by Kirscht, Haefner, Kegeles, and Rosenstock, gathered information from 1,493 adults concerning perceived severity of, and susceptibility to cancer, tuberculosis, and dental disease, plus the benefits expected from preventive actions related to these diseases. While not providing substantial support for the model, it did show consistently that those who believed in the efficacy of Pap[3] tests were more likely to have the examination done. Looking for interrelationships among the independent variables, the authors found only slight positive relationships existed between perceived susceptibility and severity, and neither

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[3]The Pap (Papanicolaou) test is an examination of cells taken from the cervix of a woman to detect uterine cancer.

susceptibility nor severity showed any strong relationship to beliefs in the benefits of taking preventive actions. The survey did not demonstrate a general preventive orientation, nor was belief in a general susceptibility to disease widespread (Kirscht et al., 1966; Kegeles et al., 1965).

One other retrospective study (Gochman, 1972) examined the Health Belief Model, but used intention to take preventive action rather than actual behavior (going to a dentist), as the dependent variable. Using a sample of 774 children, from 8 to 17 years old, Gochman divided his subjects into three groups, based on their kind of motivation: health motivation, appearance motivation, and a "mixed" motivation. He found that having a health motivation was associated with a higher intention of taking the health action. Perceived vulnerability was found to be a substantial component of the set of predictors, but perceived benefits contributed significantly only in those motivated for health reasons; Gochman thus questions the value of perceived benefits as a component of the model.

Rosenstock says that while no one of these retrospective studies explicitly supports or negates the model, taken together they provide "strong support" (1966:104). Several prospective studies also provide some support for the model.

Review of Prospective Studies of the Health Belief Model

The earliest prospective study (see Figure 3) to test the Health Belief Model was carried out in 1957, relating to the prevention of Asian flu. Two hundred families in two cities were interviewed before

Principle Investigator	Independent Variables: Perceived Susceptibility	Perceived Seriousness	Perceived Value	Dependent Variable	Important Findings
Rosenstock, et al., 1957	Signif.	Signif.	Not measured	Flu vaccination	(Only 86 in sample)
Kegeles, 1963	Signif.	Not signif.	Not signif. by itself, but was in combination with susc.	Dental checkup	Best single predictor of behavior was prior behavior
Kegeles, 1969	Precommunication: Not signif. Postcommunication: Signif.	Not tested	Precomm.: Not signif. Postcomm.: Not signif.	Pap test	Failed to show direct communication → belief change → behavioral change causal chain
Haefner and Kirscht, 1970	Support, communication increased beliefs of susc. Signif. related to intentions and checkup, but not living habits	Support	Support (comm. increased beliefs of value) Signif. related to intention and checkup but not living habits	Various preventive actions	Nonrepresentative sample (university employees)

Figure 3. Results of Prospective Studies of the Health Belief Model.

and after a flu epidemic. However, with the fast spread of the epidemic and early community vaccination programs, all but 86 of the respondents had to be excluded. The researchers found that very few of these 86 people interviewed believed that the epidemic was serious or that they were susceptible. Still, on the basis of their limited data, the researchers concluded that beliefs did make a difference in determining subsequent action (Rosenstock et al., 1960).

In 1963, Kegeles extended his study of dental practices to make it prospective. He found that the best single predictor of behavior was prior behavior. No relationship was found between perceived seriousness of dental problems and preventively-oriented visits in the resurvey no matter what variables were used as controls. Perceived susceptibility was useful predictively, especially if the respondent also believed preventive actions were beneficial. However, belief in preventive actions was not sufficient in and of itself. Two barrier factors, fear of pain and anxiety about treatment, were found to be fairly important (statistically significant at the .05 level), but the differences between those who feared treatment and those who did not were not large. Kegeles concluded that the conceptual model does predict behavior, but this predictive power is weak (1963b).

Kegeles conducted another prospective study dealing with the Health Belief Model in an urban ghetto in the latter part of the 1960's. Preexperiment interviews were taken of approximately 200 women, dealing with beliefs about vulnerability to cervical cancer, and beliefs in the efficacy of preventive measures. One week after the preinterview, each woman was revisited and given a message either on cervical cancer or

(for a control group) iron deficiency. Each respondent was also informed of a free Pap test clinic. Postinterviews were taken at the clinic, or a week after the clinic if the woman did not attend.

The study, which was seriously hampered by a large loss of cases and troubles in sampling, found high susceptibility after the experimental communication was the only belief variable significantly related to having a Pap test taken. Subjects with high scores on the value of the action were not more likely to come to the clinic; however, this group consisted of women significantly different from the rest of the population in education and previous health behavior. Kegeles does not suggest that his findings are in any way contrary to the Health Belief Model, but did conclude that his data showed no direct communication → belief change → behavioral change causal chain (1969).

A final prospective study, by Haefner and Kirscht in 1970, focused on the effects on subjects of exposure to separate films dealing with heart disease, cancer, and tuberculosis. The experiment included 166 nonacademic university employees. While there was little change in the perceived seriousness of the various threats to health following the films, there was an increase both in perceived susceptibility and perceived benefits of preventive actions. With the resurvey eight months later, persons with higher belief scores on susceptibility and benefits were more likely to have had a checkup. However, for the actions involving personal living habits (established and frequently repeated patterns of action), merely changing the person's belief

about health through experimental communications was not enough to change behavior (1970).

Summary Critique of Research on the Health Belief Model

In general, research on the Health Belief Model has been criticized for its small, nonrepresentative samples with retrospective data, the nominal scaling of variables, and lack of uniform operational definitions of the variables. Douglass also states that it does not place enough emphasis on social influence (1971). The role of each component is still not conclusive, especially perceived seriousness. Kasl and Cobb (1966) suggest that the generality of the model depends upon the design of the study.

As in all studies of attitude-behavior consistency, some difficult measurement considerations are also involved. Liska (1974) has reviewed the major issues in the controversy over attitude-behavior consistency as a research problem, and identified three major issues: the extent to which problems of measurement may alter the attitude-behavior relationship; the extent to which other competing but unmeasured attitudes may distort the observed relationship; and, the extent to which social norms which are incongruent with actual attitudes may depress the observed attitude-behavior relationship. Nevertheless, as Liska points out, attitude-behavior consistency is much higher for studies where the behavior measured represents a repetitive action. Thus, in the current study, one would expect that the attitude-behavior consistency would be high for regular exercise and regulating diet, which require everyday attention.

While weaknesses of the Health Belief Model have been noted, it has these strengths which seem to outweigh the weaknesses. First, it has appeared adequate to account for major variations in behavior in groups of individuals studied in a variety of settings. Second, it is composed of a small number of elements. Third, it appears to be capable of application to a wide variety of health actions. And fourth, beliefs along the dimensions included in the model are, at least in principle, capable of change through educational programs (Rosenstock, 1966).

In light of the general acceptability of this model, and especially as it relates to health education programs, it has been chosen to serve as a guideline for this study. Variables measured were selected not only to discover what variables are associated with regulating diet and getting regular physical exercise, but also to test the applicability of the Health Belief Model in a rural population, using daily, repetitive health behaviors which have not been tested before with this model.

Statement of Hypotheses

Taking each of the variables in the Health Belief Model and relating it to each of the two dependent variables leads to the following hypotheses:

1. There is a positive relationship between perceived susceptibility to heart disease and regulating diet.

   There is a positive relationship between perceived susceptibility to heart disease and regular physical activity.

2. There is a positive relationship between perceived seriousness of heart disease and regulating diet.

   There is a positive relationship between perceived seriousness of heart disease and regular physical activity.

3. There is a positive relationship between the perceived probability that regulating diet prevents heart disease and actually regulating diet.

   There is a positive relationship between the perceived probability that regular physical activity prevents heart disease and actually getting regular physical activity.

4. There is a negative relationship between difficulty or "cost" of regulating diet and actually regulating the diet.

   There is a negative relationship between difficulty or "cost" of exercising and getting regular physical activity.

5. There is a positive relationship between knowledge and regulating diet.

   There is a positive relationship between knowledge and getting regular physical activity.

6. There is a positive relationship between the number of past preventive actions participated in and regulating diet.

   There is a positive relationship between the number of past preventive actions participated in and getting regular physical activity.

According to the Health Belief Model, these six variables - perceived susceptibility, perceived seriousness, perceived probability that the preventive behavior prevents heart disease, difficulty,

knowledge, and number of past preventive actions - influence preventive health behavior.[4]

[4] Stated in a functional format, $Y=f(X_1, X_2, X_3, X_4, X_5, X_6)$ where Y is the dependent variable (regulating the diet or getting regular physical exercise) and X_1 to X_6 are the independent variables listed in the hypotheses above.

CHAPTER III

METHODOLOGY

The Study Setting

The research question for this study was examined using data from a rural area. While no consensus has been reached on one composite definition of "rural," the area in this study corresponds to several singular measures of rural which are often used, i.e., population size, population density, and remoteness from urban centers.

The area chosen for this study was Potter County, in north central Pennsylvania. Potter County has no large population centers, with only one borough having a population exceeding the census criteria for rural (2,500), and this borough exceeds it only slightly (Coudersport, 1970 population of 2,831). Five smaller boroughs in the county have populations ranging from 590 to 1,552; the total population of Potter County in 1970 was only 16,395.

The population density in Potter County is also very low: 15.0 persons per square mile. The Pennsylvania state average is 262.3 persons per square mile. Only 3 of Pennsylvania's 67 counties have densities lower than Potter County (U. S. Bureau of the Census, 1970: 24-25).

The study area also fits a third definition for rural, remoteness from urban centers. Potter County is not close to any Standard Metropolitan Statistical Areas (SMSA); the closest center city of an SMSA to the east is Binghamton, New York, which is approximately 120 miles from the northeastern corner of the county; and to the west, Erie,

Pennsylvania, which is approximately 105 miles from the western border. Thus, using three different measures - population size, density, and remoteness - it is clear that the area chosen for the study is rural.[5]

Data Collection and Unit of Analysis

A county-wide survey of households was conducted during the months of June and July, 1974. This survey was designed to measure items related to health practices, attitudes, and knowledge of adults (18 years and older) in the county. Precoded interview schedules (see Appendix), which had been pretested with a similar population, were used. The schedule took approximately half an hour to administer.

The information was gathered by 20 interviewers, most of whom lived within the county. The interviewers had no prior experience in household surveys, but attended a three-day training school, with practice sessions. The actual interviews were taken whenever possible with no third party present during the interview in order to insure that the interviewee would not modify answers to conform to group norms (Taietz, 1962).

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[5]This study is part of a larger research project funded by the Pennsylvania Department of Agriculture to assess the effectiveness of a health education program on increasing the rate of adoption of recommended preventive health practices. Potter County was chosen for the research project primarily for two reasons: first, to follow up some earlier health-related research conducted in the county (Chapman et al., 1973), and secondly, because of its rural character. Positive attitudes toward the study on the part of local citizens during preliminary work were also influential.

In order to assess change associated with the educational program, a preprogram survey was carried out. Data for the present study were taken from this preprogram survey.

The sampling design was a stratified random sample, stratified on the basis of both residence and occupation. The overall sampling rate for the county was 9 percent (of the adult population), although the actual sampling rate varied by minor civil division, and was higher for the farm population. Areal-sequential interviewing procedures (starting in the northwestern corner of the county and moving east and later south) were adopted to minimize the risks of information diffusion during the five weeks in which the interviews were being taken.

A total of 985 men and women were interviewed. However, in order to hold constant the variable "sex," and because of difficulties in obtaining an equal number of interviews from males, the present analysis examines data only for the 689 women included in the sample.

In order to focus on "preventive" health behavior, those in the population who reported chronic illnesses or serious recurring health problems were excluded. The exclusion of these cases was based on the assumption that regulating diet and getting regular exercise for those chronically ill or those with a recurring health problem might not constitute a preventive health practice.

The unit of analysis then, for the present study, was the adult female who did not report any chronic illnesses or serious recurring health problems. A total of 419 cases fit this definition. However, 136 cases were subsequently dropped because of missing data (see below).

The Dependent Variables

Two measures of preventive health behavior related to heart disease were chosen to be examined more closely in this study: regulating diet and getting regular exercise. While important for weight

control and general well-being, these two behaviors have especially been linked to preventing heart disease. The measure for regulating diet[6] involved the woman's own perceptions of her eating practices. (No attempt was made to check the validity of this perception through use of a 24-hour food-recall chart or similar measure.) Preventive eating habits were indicated by two statements: "I regulate my diet to keep healthy," and "I am careful about what I eat." The two statements were correlated to ensure that they were measuring a similar dimension. The correlation coefficient was .64, thus indicating that it was useful to combine the measures together to form an index (and not so high as to indicate that the two were measuring exactly the same thing).

For each of the two statements about diet control, the respondent was asked to state whether it was applicable "never," "occasionally," "depends," "usually," or "always." To increase reliability, responses of "usually" or "always" were combined into one category, as were those responses of "never" or "occasionally." A respondent received two points for a response of "usually" or "always," and one point for a response of "depends," with no points given for the negative responses. Points were added for the two questions, giving an index ranging from 0 to 4. The distribution of responses for this index was: 0 points - 27 percent; 1 point - 9 percent; 2 points - 15 percent; 3 points - 11 percent; and 4 points - 38 percent. One case had to be excluded because of a noncodable response.

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[6] Regulating diet and preventive eating habits are used synonymously for purposes of this paper.

Regular exercise was measured by a list of activities, for which the respondent reported each activity she had engaged in during the past year. The list included jogging, swimming, bicycling, long walks, basketball, tennis, baseball, golf, and doing exercises; the respondent was also asked for any activities other than those included in the listing. For each activity, a minimum time or intensity level was specified, e.g., "jogging, one mile or more." If the respondent indicated that she had participated in an activity at the minimum level, she was also questioned as to the frequency of participation: very frequently, frequently, occasionally, rarely, or very rarely. For each activity participated in either very frequently or frequently, one point was assigned. These were then summed for an "activity index"; categorization for descriptive purposes showed that 32 percent had no frequent activities, 31 percent - 1, 21 percent - 2, 9 percent - 3, and 7 percent had 4 or more activities (see Table 1).

Table 1. Regular Activities Participated in During the Past Year.

	Percent of Respondents
No activities	32
One activity	31
Two activities	21
Three activities	9
Four or more activities	7
	100

A third dependent variable, that of having blood pressure checked, was also initially selected for this study, but it was found that 99 percent of the women reported that their blood pressure had been checked, and 91 percent reported that the check had been within the past three years. While this finding was significant for the purposes of the larger project, it precluded the use of this health practice as a variable in this study, since the lack of variation made it statistically of no utility.

The Independent Variables

Using the Health Belief Model as a guide, the independent variables chosen included: 1) perceived susceptibility to heart disease; 2) perceived seriousness of heart disease; 3) cost (difficulty) of each preventive behavior (barriers); 4) perceived probability that action produces results, i.e., prevents heart disease; 5) knowledge related to weight control; and 6) past experience with other preventive actions.

Similar to other research, the perceived seriousness of heart disease did not prove useful since it did not vary significantly: it was almost universally believed (96 percent) that heart disease is serious or extremely serious. The question of the general value of controlling weight and getting regular exercise to prevent heart disease also showed little variance; using these measures, 94 percent and 87 percent, respectively, agreed that these two practices were important in preventing heart disease. Thus, 4 of the original 6 independent variables remained to be related to the two dependent variables.

Perceived susceptibility was measured by asking "how likely do you feel you are to get . . . heart disease?" Possible responses were "very likely, likely, depends, unlikely, very unlikely." To facilitate analysis, these were collapsed into three categories, with "very likely" and "likely" receiving two points (32 percent of the respondents), "depends" one point (23 percent of the respondents), and "unlikely" and "very unlikely" no points (45 percent of the respondents). "Don't know" answers excluded 53 cases from the analysis.

The degree of difficulty of the preventive act, a measure of the barriers, was obtained by the question: "How difficult is it for you to . . . regulate your diet?" and for exercise, "How difficult is it for you to . . . get regular physical activity?" Possible responses included "very difficult," "difficult," "average," "easy," and "very easy." These were recoded into three categories, with "very difficult" and "difficult" together, and "easy" and "very easy" together. For regulating diet, 51 percent of the women interviewed responded that it was "easy" or "very easy"; 25 percent said "depends"; and 24 percent said it was "difficult" or "very difficult"; three cases had noncodable responses and were excluded. Getting regular physical activity was "easy" for 70 percent, "depends" for 22 percent, and "difficult" for 8 percent; two cases were excluded with "don't know" responses.

Knowledge was measured by a series of questions on calories. If the respondent affirmed that she was familiar with the term "calories," she was asked a series of three questions choosing the larger caloric value between two foods: a medium-sized apple or a serving of pie; 8 soda crackers or 4 ounces of steak; and 1/2 cup of peanuts or 1 large

hardboiled egg. These were coded as correct or incorrect (or don't know) answers, with a point given for each correct answer. Respondents were also asked, "How many calories less than normal do you think a person has to eat over a period of several days in order to lose one pound?" Responses were grouped into two categories: approximately the correct answer (2,500 to 4,500 calories) and an incorrect (or don't know) answer. One point was given for a correct answer. An index was then formed from the three caloric comparisons and the calorie question, with a range of 0 to 4. Frequency tables revealed that 4 percent of the respondents received 0 points, 4 percent obtained 1 point, 48 percent had 2 points, 37 percent received 3 points, and 7 percent had 4 points. Most of the points were attributed to the comparison questions; only 12 percent of the respondents knew the correct number of calories which must be omitted from the normal diet in order to lose one pound.

For a measure of the fourth independent variable, past experience with other preventive actions, the respondent was asked how many of seven preventive actions (chest X-ray, dental checkup, flu shots, eye examination, blood test, urine test, and Pap test) she had participated in during the past year. One point was assigned for each preventive action, and then summed for an index of past preventive actions. None of the actions had been taken by 13 percent of the respondents; 13 percent had taken 1; 14 percent - 2; 18 percent - 3; 20 percent - 4; and 22 percent - 5 or more.

Control Variables

The effect of demographic and social characteristics is also

recognized in the Health Belief Model. Four variables, suggested by Coburn and Pope as important (1974) - age, education, income, and organizational participation - were included in this analysis. Sex (female) and residence (rural) were held constant by design (Runkel and McGrath, 1972:51).

Age was derived from the question, "What is your date of birth?" For descriptive purposes, the respondents were grouped into categories: 16 percent of the respondents (adults over age 18) were less than 25 years of age; 47 percent were 25 to 44; 25 percent were 45 to 64; and 12 percent were 65 or older. Only two respondents refused to answer, and these were excluded. Age was used as a continuous variable in the analysis.

Years of education were also grouped for descriptive purposes: 7 percent had completed less than 9 years of schooling, 70 percent had 9-12 years, and 23 percent had more than a high school education; one case had no answer, and was excluded. In the analysis, education was used as a continuous variable.

Total family income (self-reported) was grouped into seven categories: less than $3,000; $3,000 to $4,999; $5,000 to $6,999; $7,000 to $9,999; $10,000 to $11,999; $12,000 to $14,999; and $15,000 and over. Each category had a number and the respondent, holding a card with the list of categories, was asked to designate the number of the category which was applicable. Even using this approach, 94 cases had to be excluded because of a refusal to respond or a "don't know" answer. Twenty-four percent of the respondents reported less than

$5,000; 31 percent fell between $5,000 and $9,999; 33 percent $10,000 to $14,999; and 12 percent more than $15,000.

Organizational participation ("Are there any local or county-wide organizations that you attend frequently?") was dichotomized, yes or no, and used as a dummy variable in the analysis. Fifty percent of the respondents indicated "yes"; two cases had to be excluded as "no answer."

A total of 136 cases were excluded because of missing data, leaving a final sample size for the analysis of 283.[7]

Testing the Relationships

In order to best bring to light the associations that exist, Pearson Correlation Coefficients were generated, and the variables were also entered into a stepwise multiple regression technique. Interrelationships between the independent variables were first explored, and then each variable was related to the dependent variable. Partial correlation techniques were utilized to further analyze the relationships. One-tailed tests of significance were generated, and a .01 level of probability was used for a measure of statistical significance. However, because of a large sample size, a variable was not considered substantively significant unless it explained at least 3 percent of the variance. Significance levels and signs attached to coefficients only apply to the correlation coefficients (not regression coefficients).

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[7] The previously reported lack of variance in the two independent variables not pursued in this study (perceived seriousness and perceived value of the preventive act) was also true for the final N of 283.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

Interrelationships Among the Independent Variables

In order to test for interrelationships among the independent variables and the control variables, correlation coefficients were generated (see Table 2). Perceived susceptibility and past preventive actions were not significantly related to any of the other independent or control variables. Neither of the difficulty variables (difficulty of regulating diet and difficulty of getting regular exercise) were related to the other independent variables, although the two variables themselves were interrelated (r=.36). Knowledge of calories was negatively related to age, and positively correlated with education, but these correlations were low enough that problems of multicollinearity should not enter into subsequent analysis. In discussing multicollinearity, Blalock (1963) only considers misinterpretations because of interrelationships when the independent variables have a correlation of at least .30.

Slightly higher correlations were found among the control variables: age and income (r=-.28); education and income (r=.38); education and organizational participation (r=.30); and, income and organizational participation (r=.21). Attempting to partial out the exact effect of each of these variables could lead to slight misinterpretations because of multicollinearity, and therefore will not be pursued in this study.

Table 2. Interrelationships Among the Independent Variables.

	Correlation Coefficients (N=283)							
	Difficulty Preventive Eating	Difficulty Exercise	Knowledge of Calories	Past Preventive Actions	Age	Education	Income	Organizational Participation
Perceived Susceptibility	-.06	-.05	-.01	-.06	.01	-.11	.02	-.09
Difficulty-Prev. Eating		.36*	†	.13	.08	.03	-.06	-.03
Difficulty-Exercise			.08	.01	-.01	.09	-.01	-.02
Knowledge-Calories				.11	-.19*	.16*	.13	.12
Past Preventive Actions					-.07	.13	.09	.15*
Age						-.13	-.28*	.09
Education							.38*	.30*
Income								.21*

*Significant at .01 level † $|r| < .01$

In summary, of the 36 correlations, only 8 were statistically significant, even with the large N of 283. Further, of these 8, all were low, and mainly between the control variables rather than the independent variables. These findings are similar to the findings of the recent national study (Kirscht et al., 1966) which indicated only very slight interrelationships between the independent variables, or none at all.

Preventive Eating Habits

Perceived Susceptibility

According to the Health Belief Model, those individuals who perceive themselves as quite susceptible to heart disease will be most likely to be the ones who actually engage in the preventive practice, i.e., preventive eating habits. However, these data did not provide support for that hypothesis: perceived susceptibility was not correlated with having preventive eating habits (r=.07).[8] Controlling for age, education, income, and organizational participation did not add any strength to the correlation. Therefore, perceived susceptibility can not be used in this case to explain preventive eating habits.

Difficulty of Regulating Diet

Of the four independent variables used, the perceived difficulty in regulating diet showed the strongest relationship with preventive eating habits. Those who found it less difficult to regulate their

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[8] Probability values are given only for those which had a probability of less than .01.

diet were most likely to be the ones who did regulate their diet, as would be expected.

The zero-order correlation coefficient for difficulty and preventive eating was .28 ($p < .001$). This relationship remained constant when controlling for the four control variables with partial correlations. In a stepwise regression framework (see Table 3), difficulty of regulating diet was the most important and first variable entered; 7 percent of the variance in preventive eating habits could be explained by the perceived difficulty in regulating diet. Therefore, perceived difficulty of regulating diet is useful with these data to explain preventive eating habits.

Table 3. Coefficients for Analysis of Stepwise Multiple Regression of Preventive Eating Habits on Independent and Control Variables.[a]

	Multiple R	R^2	R^2 Change
Difficulty-Preventive Eating	.28	.07	--
Education	.31	.10	.03
Past Preventive Actions	.34	.12	.02

[a]While not printed in this table, the regression coefficients indicated the same results as the correlation coefficients (given in table).

Knowledge

Knowledge of caloric values was not associated with preventive

eating habits (r=.04). Those who scored higher on the knowledge of calories index were not necessarily the ones who regulated their diets. Controlling for age revealed a slight suppressor effect, but education and organizational participation had a slightly opposite effect. The hypothesis that there is a positive relationship between knowledge and regulating diet was, therefore, not supported with these data.

Past Preventive Actions

The number of preventive acts taken during the past year (out of a list of seven items) did show a positive correlation with preventive eating (r=.17, $p < .01$): those who had participated in more other preventive actions were more likely to be regulating their diet. However, this correlation was reduced to .14 when education and organizational participation were controlled.

Put in a multiple regression framework (see Table 3), past preventive actions was the third variable to be entered into a stepwise regression; however, it only explained an additional 2 percent of the variance. Therefore, while not contrary to the hypothesized relationship, the data fail to clearly indicate that past preventive actions is useful to explain preventive eating behavior.

Control Variables

While not considered in the same "causal" sense as the independent variables, one of the control variables, education, also showed a relationship with preventive eating habits. Education correlated with preventive eating at .17 ($p < .01$) and, in the multiple regression

framework, explained 3 percent of the variation. Those with higher education were more likely to be preventive eaters. Organizational participation also showed a correlation of .17 ($p < .01$), but explained very little additional variance. Correlations with age ($r=.13$) and income ($r=-.02$) were too small to be considered definitive.

Regular Physical Exercise

Perceived Susceptibility

The correlation of perceived susceptibility with getting regular physical exercise was not significant at the .01 level ($r=-.13$); further, this relationship was in the opposite direction than was hypothesized. This low negative correlation was reduced slightly by controlling for education and organizational participation with partial correlations, but retained the negative sign. Therefore, the hypothesis that those who perceive themselves more susceptible to heart disease will be more likely to engage in regular physical exercise was not supported.

Difficulty of Getting Regular Exercise

The difficulty associated with getting regular exercise did have an effect on actually getting exercise ($r=.21$, $p < .001$); those who felt it was less difficult were more likely to get regular physical exercise. When partialling out the effects of age, difficulty still showed the strongest relationship of the four independent variables.

In a multiple regression framework (see Table 4), the difficulty variable was the second variable entered in the stepwise regression,

Table 4. Coefficients for Analysis of Stepwise Multiple Regression for Regular Physical Activity on Independent and Control Variables.

	Multiple R	R^2	R^2 Change
Age	.31	.09	
Difficulty-Exercise	.37	.13	.04
Knowledge	.40	.16	.03

following only age. The hypothesis that there is a negative relationship between the perceived difficulty of regular exercise and actually getting exercise was therefore supported.

Knowledge

Knowledge of calories, while not related to preventive eating habits, did show a relationship to regular physical exercise ($r=.23$, $p < .001$). Those who were more knowledgable about caloric values were more likely to be engaged in regular physical exercise. This relationship was weakened somewhat, however, when the influence of age, education, and organizational participation were removed ($r=.17$), $p < .01$). In a multiple regression framework (see Table 4), the knowledge variable was entered third, explaining about 3 percent of the variance. Therefore, it can be concluded that, using these three statistical measures, knowledge of calories is positively related to preventive physical activity.

Past Preventive Actions

Regular physical activity and past preventive actions were related in the direction hypothesized ($r=.14$, $p < .01$), but this variable did not explain even 2 percent of the variance. Partialling out the effects of age, education, income, and organizational participation reduced the correlation coefficient to .11. While not contrary to the hypothesized relationship, it can not be considered supportive.

Control Variables

Age was more closely correlated with regular physical activity than any other variable studied ($r=-.31$, $p < .001$). As would be expected, the correlation was negative: older persons were less likely to be engaging in regular physical activity, or at least less likely to be engaging in many types of exercises. In the stepwise regression (see Table 4), age was entered first, explaining 9 percent of the variance. While not being considered "causal," it is clear that age must be taken into account when considering regular physical activity as a variable.

The other control variables did not exhibit strong relationships. Income was positively correlated ($r=.14$, $p < .01$), as was education ($r=.11$) and organizational participation ($r=.07$), but these did not provide input significant for explanation.

Summary

In summary (see Table 5), difficulty of preventive eating, past preventive actions, education, and organizational participation were

Table 5. Summary of Relationships Between Dependent and Independent Variables.

Correlation Coefficients (N=283)		
	Dependent Variables	
Independent Variables	Preventive Eating Habits	Regular Physical Activity
Perceived Susceptibility	-.07	-.13
Perceived Difficulty-Preventive Eating	.28*	
Exercise		.21*
Knowledge	.04	.23*
Past Preventive Actions	.17*	.14*
Age	.13	-.31*
Education	.17*	.11
Income	-.02	.14*
Organizational Participation	.17*	.07

*Significant at .01 level.

all related positively, with statistically significant correlation coefficients, to preventive eating. However, as noted earlier, past preventive actions and organizational participation explained less than 3 percent of the variance.

Related at a statistically significant level to getting regular physical activity were perceived difficulty of exercise, knowledge, past preventive actions, age, and income. However, again, past preventive actions and income explained less than 3 percent of the variance, and thus are not considered conclusive enough to be useful for application in programs.

Interpreting the Relationships

Perceived Susceptibility

The lack of relationship between perceived susceptibility and these two preventive behaviors could be explained by two factors. First, those already taking the preventive act may look on themselves as less susceptible since they are already engaging in good habits, which they perceive as lowering susceptibility. Heinzelmann and Bagley (1970) found this to be the case in their study of the effects of a physical activity program. This, again, shows the difficulty of trying to assess a time order from cross-sectional data: high perceived susceptibility could have at one time led the individual to preventive habits, and thus, a reduction of perceived susceptibility Time-series data, with very sensitive measures of this variable, would be necessary to consider this question.

A second reason for the lack of relationship between perceived susceptibility and preventive eating and exercising might be a weaker perception of the direct link between heart disease and exercising or careful eating. While most people consider seeing a health professional in the absence of disease as preventive, and associate regular toothbrushing with preventing cavities or polio vaccines with preventing polio, the link between preventing eating or exercising and heart disease may not be as clear or as strong. More sensitive measures are needed to test this.

With this set of data, the importance of perceived susceptibility in determining preventive eating and exercising appears minimal. This

corresponds to Haefner and Kirscht's finding (1970) that susceptibility was not related to preventive behaviors involving daily living habits. Therefore, for programming in these two preventive areas, a simple effort to increase awareness of susceptibility to heart disease would evidently not necessarily lead to the increased practice of these two preventive behaviors.

Difficulty

The stronger relationship between perceived difficulty and engaging in the preventive action indicated the importance of the "barriers" component of the Health Belief Model. Those who felt that it was difficult to regulate their diets or get regular physical exercise tended to be the ones who did not do it, regardless of age, education, income, or organizational participation. This is similar to Teräslinna's finding (1969) which suggested distance to the gymnasium as being an important deterrent to engaging in an exercise program. These data suggest that age is also a "barrier" since those who were older were less likely to be getting exercise. Programming efforts which focus on reducing the difficulty, or more specifically, reducing the perceived difficulty, of regular exercise and regulating the diet in specific dimensions, would seem to be the most effective efforts.

Knowledge

Knowledge of calories did show a correlation with preventive exercising, but it was not related to preventive eating. The effect

of knowledge on preventive actions in this case is not clear. However, this measure was specifically a question of knowledge of calories rather than knowledge of heart disease; perhaps the latter would show a stronger relationship. At any rate, these data point to the possibility that knowledge is not as important in efforts to increase preventive health behavior as reduction of barriers or difficulty.

Past Preventive Actions

While other researchers (e.g., Kegeles, 1963b) have found a high correlation of past preventive actions with the current preventive practices they were studying, these data do not suggest a strong relationship between past preventive actions and either engaging in preventive eating habits (r=.17) or getting regular physical exercise (r=.14). These relationships reflected the influence of the control variables, especially education. One reason for the low relationship may be that these two behaviors involve daily habits, unlike the preventive actions which make up the index for the variable "past preventive actions"; correlations with other regular preventive behaviors, such as regular toothbrushing, might indicate a higher correlation. Further, these two health behaviors may not be as widely recognized as preventive acts as those which involve health professionals.

Control Variables

Age, education, income, and organizational participation contributed to the explanation only in two cases, age in connection with

exercise, and education with preventive eating. This contrasts Coburn and Pope's suggestion (1974) that these four variables are the most parsimonious set for predicting preventive health behavior. It also brings to question Douglass's contention (1971) that demographic and socioeconomic status variables are most important, unless one suggests that the nature of the setting in this study (a rural area) has heavily influenced the relationships.

The Health Belief Model

The data from this research neither provide support for the Health Belief Model, nor is an explanation of preventive behavior facilitated by using the variables in this model. Perceived susceptibility was not significant, and perceived seriousness and perceived "value" did not vary enough to be useful. This left difficulty as the most explanatory variable; the contributions of knowledge and past actions to the explanation remain unclear. Perhaps more generally, this model is not as useful for variables dealing with consistent habits over time as it is for variables of once-occurring or infrequent actions. Or, as Rosenstock suggests (1969), the role of cues to action (not measured in this study) may be more influential than previously thought, and an integral part for testing the model. Further research on this model with retrospective data would not seem useful since the susceptibility component can only be explored with prospective data.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

Preventive health practices have long been suggested as a valuable way of improving overall levels of health in our society. To facilitate attempts to increase participation in preventive practices, social scientists and other researchers have attempted to single out variables associated with the adoption of these preventive health practices.

The present study is focused on two specific preventive practices - engaging in preventive eating habits and getting regular physical activity - in relation to the prevention of heart disease. A model for explaining health behavior, the Health Belief Model, was chosen as a guideline for the study.

The Health Belief Model focuses on the subjective states of the individual in the areas of vulnerability and seriousness of disease, and value of preventive behaviors. The model suggests that certain factors - difficulty of the preventive act, knowledge, past preventive actions, probability that the action prevents disease, plus demographic and socioeconomic factors - influence a person's belief about the value of the preventive behavior and the threat of disease (see Figure 1).

To test the usefulness of this model with two preventive health habits requiring frequent attention (engaging in preventive eating habits and getting regular physical activity), data were collected

through a household survey from residents in a rural county. Data were used for women who had no chronic illnesses or recurring health problems (for whom complete data were available), leaving a final sample size of 283 cases.

Two of the variables in the Health Belief Model, perceived seriousness of the disease and the general value of the preventive practice in preventing disease, did not vary enough in this study to be useful for analysis. In the case of perceived seriousness, 96 percent believed that heart disease was serious or extremely serious. In responses for the perceived value of the preventive measures, 94 percent stated that controlling weight was important in preventing heart disease, and 87 percent said that getting regular exercise was important. Therefore, these two variables could not be used in the analysis.

Four independent variables, drawn from the model, were used in the analysis. These included perceived susceptibility to heart disease, perceived difficulty of participating in the two selected preventive health practices, knowledge of calories, and preventive health actions taken during the past year.

Perceived susceptibility was not related either to engaging in preventive eating habits or getting regular physical activity (see Table 5). Using these cross-sectional (or retrospective) data, susceptibility was not found to be a useful variable for explaining the selected health behaviors.

Of the four independent variables selected for this study, perceived difficulty of the preventive behavior showed the strongest

relationship to the dependent variables. With regard to both preventive eating habits and getting regular exercise, those who felt the behavior was more difficult were less likely to be the ones practicing the health behavior. This finding points to the importance of barriers in deterring potential health behavior, and suggests that eliminating or reducing barriers might be the most effective way to increase the adoption of these two health behaviors, at least among rural women who have no chronic illnesses.

Knowledge of calories was positively related to getting regular physical activity, but not related to engaging in preventive eating habits. This leads one to question the importance of only increasing knowledge in attempting to increase preventive health behavior. Or, it may simply suggest that the measure used here for this variable was not enlightening, and alternate measures used to be explored.

Preventive health actions taken during the previous year also failed to be useful. While related to the dependent variables at a statistically significant level, the variable explained less than 3 percent of the variance, and can only be considered suggestive of a positive relationship.

Four control variables - age, education, income, and organizational participation - were also incorporated into the analysis. These variables altered the relationships between the dependent variables and independent variables only slightly. However, 2 of the 4 themselves were related to one of the preventive behaviors: age was negatively correlated with getting regular exercise, and education was positively correlated to engaging in preventive eating habits.

Since some of the variables in the Health Belief Model simply had to be dropped in this study, these data do not provide concrete evidence against the model, but rather point to the necessity of uniform operational definitions of the variables. This, along with time-series data, will be necessary before any definitive conclusions can be made about the relevance and usefulness of the Health Belief Model, not only in reference to the health behaviors studied here, but for any application of the model.

Conclusions

For this group of rural women who had no chronic illnesses, perceived difficulty of engaging in preventive eating habits and of getting regular physical exercise was the most important reason for not practicing these two health behaviors. Therefore, health educators would find it useful to attempt to reduce this perceived difficulty. Examples of this would be initiating groups which provide child care facilities to allow women to exercise together; distributing tips on how to prepare food easier while controlling for certain dietary restrictions; forming groups to discuss how regulating diet and getting regular exercise can be made easier; and, suggesting ways to tie exercising in with other daily habits.

Two major limitations of this study were found. The first was the necessary exclusion of two main variables of the Health Belief Model because of a lack of variation: almost everyone believed in the seriousness of heart disease and in the value of the preventive acts. While this was a deterrent to testing out the Health Belief Model, it

does suggest that health educators need not focus on trying to increase these two beliefs (as measured here), but rather to reduce barriers.

The second limitation to the study was the use of the Health Belief Model with cross-sectional rather than time-series data. However, continued research is planned with this group of respondents in order to make available longitudinal data for testing the model.

The present study dealt only with women; further research with the data from this rural county is needed to see if the results are similar for the males, or if their patterns of preventive behavior differ. While exclusion of males for this research added clarity by dealing only with a subset of the population, further analysis with the males may bring to light different results in relation to the Health Belief Model.

Further research on preventive health behavior will be most useful if comparative models are drawn up and tested in conjunction with the Health Belief Model. New formulations of preventive health models might well place more emphasis on sociological variables, such as group norms and pressures, reference groups, and peer attitudes. Weight Watchers clubs, Alcoholics Anonymous groups, and others have especially provided evidence for the importance of the roles of expectation, support, and social facilitation. Other levels of explanation, such as the biological and psychological, also need to be included for model testing, and possible interactions explored.

The importance of the Health Belief Model for health educators was manifested recently by a journal for health educators which was entirely devoted to a discussion of the model. With the current

overwhelming dominance of this model in the research on health behavior, clear-cut support or negation is the necessary next step. This research and numerous others (e.g., Kegeles, 1969; Kirscht et al., 1966) raise questions as to the usefulness and applicability of the Health Belief Model. As noted earlier, standardized measurements for each of the variables is most important, so that replication will be more conclusive. If the model is not supported in further research, alternative models should be tested. If support for the Health Belief Model is forthcoming, and is found in various studies throughout the United States, these principles could provide direct input for health educators across the nation.

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APPENDIX A

INTERVIEW SCHEDULE

Interview Questions for Dependent Variables

Preventive Eating Habits:

12.1 I have several statements about health. Using this card (SHOW CARD), select the one that best suits your feelings about each statement as I read it aloud.

1 = Never
2 = Occasionally
3 = Depends
4 = Usually
5 = Always

a. Registered nurses or other doctor's assistants could treat some of my sicknesses.

*b. I am careful about what I eat.

c. I would go to a registered nurse for medical help if it were possible.

*d. I regulate my diet to keep healthy.

e. I would accept medical help from a health aide working under a doctor.

Regular Physical Exercise

9.1 Did you happen to participate in any of these activities during the past year? (SHOW CARD)

1 = NO
2 = YES
9 = DK/NA

If yes, using the scale at the bottom of the card, how often?

a. Jogging or running (1 mile or more)

b. Swimming (in season) (active swimming 15 minutes or more)

c. Gardening (1/2 hour or more)

d. Bicycling (2 miles or more)

1 = Very frequently
2 = Frequently
3 = Occasionally
4 = Rarely
5 = Very rarely

9.1 (Continued)

e. Long walks (1 mile or more)

f. Basketball (1/2 hour or more)

g. Tennis (in season) (1/2 hour or more)

h. Baseball (in season) (1/2 hour or more)

i. Golf (in season) (9 holes or more)

j. Doing exercises (15 minutes or more)

k. Other _____

_____

1 = Very frequently
2 = Frequently
3 = Occasionally
4 = Rarely
5 = Very rarely

Interview Questions Related to Health Belief Model

Perceived Susceptibility:

13.1 Some people are more likely to get some diseases than others. (SHOW CARD) Using this scale, how likely do you feel you are to get each of these diseases:

Very Likely	Likely	Depends	Unlikely	Very Unlikely
1	2	3	4	5

*a. Heart disease

b. Cancer

c. Diabetes

d. Glaucoma

e. Headaches

f. Emphysema

g. Stomach ulcers

Perceived Seriousness:

13.2 How serious do you rate each of these diseases? (SHOW CARD)

Extremely Serious	Serious	Depends	Not too Serious	Not at all Serious
1	2	3	4	5

*a. Heart disease

b. Cancer

c. Diabetes

d. Glaucoma

e. Headaches

f. Emphysema

g. Stomach ulcers

"Value" of Preventive Practice:

5.2 As you may have noticed in reading magazines and newspapers, different authors have suggested various things connected with heart disease. In your opinion, how important are each of these actions (SHOW CARD) in preventing heart disease? (Probe: how important?)

Very Important	Important	Depends	Unimportant	Very Unimportant
1	2	3	4	5

Don't Know
9

a. Taking vitamin pills

*b. Controlling weight

c. Getting plenty of rest

d. Having blood pressure checked

e. Drinking lots of water

f. Eating only organic foods

g. Having periodic health exams

h. Having a chest x-ray

*i. Participating in regular exercise or physical activity

j. Not smoking

Perceived Difficulty:

Finally, in terms of personal inconvenience, how difficult is it for you to do each of these? (SHOW CARD)

Very Difficult	Difficult	Average	Easy	Very Easy
5	4	3	2	1

a. See a doctor for a physical examination

b. Have your blood pressure taken

c. Have regular dental checkups

*d. Regulate your diet

*e. Get regular physical exercise

f. Take medicine on a regular basis

Knowledge:

Now the next few questions deal with nutrition and weight.

10.4 Are you familiar with the term, "calories" as used in a sentence like "A chocolate sundae has lots of calories"?

1 = NO (GO TO Q. 11.1) 9 = NA
2 = YES

10.5 This next question compares foods, and I want you to tell me which one of the two I name contains the larger number of calories. If you don't know, just indicate that to me.

a. One medium size apple or 1 serving of pie

b. Eight soda crackers or 4 ounces of steak

c. One-half cup peanuts or 1 large hardboiled egg

10.6 How many calories less than normal do you think a person has to eat over a period of several days in order to lose one pound?

Past Preventive Actions:

6.2 Now, the next several questions deal with activities that you may or may not have had a chance to do since last July.

1 = NO
2 = YES
9 = DK/NA

Have you had?

a. A chest x-ray

b. Dental checkup

c. Flu shots

d. Eyes examined

e. Blood test

f. Urine test

(WOMEN ONLY)

g. Pap test

Control Variables:

4.4 What is your date of birth?

Month _____ Day _____ Year _____

15.6 How many years of school have you completed? _____
(PROBE: 8th grade, finished high school, 2 years of college, etc.) (Write in exact number)

16.1 Which of these numbers (SHOW CARD) represents the total family income of your household for the past 12 months (before taxes and other deductions)?

1 = Less than $ 3,000
2 = $ 3,000 - $ 4,999
3 = $ 5,000 - $ 6,999
4 = $ 7,000 - $ 9,999
5 = $10,000 - $11,999
6 = $12,000 - $14,999
7 = $15,000 and over
9 = DK/NA

16.2 Are there any local or county-wide organizations that you attend frequently? (PROBE: for example, church, fraternal organization, etc.)

1 = NO
2 = YES
9 = NA

NAME OF ORGANIZATION	HOW OFTEN DO YOU MEET
_____	_____
_____	_____
_____	_____